List of Figures

1.1	Spring distribution across India as per the information shared by various organizations.	9
1.2	Spring count across different districts of India	10
2.1	Free flow spring	18
2.2	Seep spring	18
2.3	Waterlogging due to seepage	18
2.4	Swampy wetland	18
2.5	Pond	19
2.6	Dugwell	19
2.7	Artesian well	19
2.8	Springs with piped outlet	19
2.9	Bowli in Udhampur district of J&K	20
2.10	Schematic diagram of spring	22
2.11	Different components of the spring system	23
2.12	Schematic diagram showing the genesis of a thermal spring	24
2.13	Various geothermal provinces, identified by GSI, responsible for the genesis of varied temperature thermal springs in the country	25

List of Figures

2.14	Different type of springs on the basis of geo-hydrological conditions .	27
3.1	SOI toposheet showing the spring location	34
3.2	Geotagging of spring with handheld GPS	35
3.3	Establishment of monitoring station for Level III survey	38
4.1	Discharge measurement of a free flow spring	42
4.2	Discharge measurement of a Seep type spring	42
4.3	Different shapes flume appropriate to the shape of spring openings	43
4.4	Installation of flumes and AWS	45
4.5	Spring hydrographs	49
5.1	Illustration of springshed	53
5.2	Workflow of steps for springshed management	55
5.3	Conceptual 3D model of the springshed	57
6.1	Steps for water quality monitoring	65
6.2	Spring water collection and in-situ analysis	71
6.3	Showing the procedure to be followed during sampling and analysis of water samples	74
6.4	Various salient points for QA/QC of any water quality lab \dots	78
6.5	Piper trilinear diagram representing the hydrogeochemical facies of spring water	80
6.6	Chadha Diagram	82
7 1	Spring water collection for isotope analysis	96

7	.2	A typical example of altitude-wise (680-2302 m, amsl) field set-up of Ordinary Raingauges (ORGs) in a catchment to capture the altitudinal signature of rain	97
7	.3	Plot of isotopic values of different springs along with developed LMWL for the study area (SP denoted for Spring)	98
7	7.4	$\delta^{18}O$ and δ^2H values of rainfall vs altitude showing the recharge elevations of springs	98
8	.1	View of geotextile used for topsoil stabilization and soil moisture conservation	102
8	.2	Contour cultivation	103
8	.3	Mulch tillage	103
8	.4	Mixing of seeds in soil	109
8	.5	Seed-mixed soil balls	109
8	.6	Contour bunds to groundwater recharge	110
8	.7	Engineering measures for soil and water conservation	112
8	.8	Engineering measures for springshed management	115
8	.9	Staggered contour trenches	116
8	.10	Continuous contour trenches	117
8	.11	Terraced fields	118
8	.12	Different terraces that can be constructed in the springshed to enhance the soil moisture	119
8	.13	Percolation/storage Pond	119
8	.14	Brushwood checkdam	120
8	.15	Loose boulder/stone check dams	121
8	.16	Rainwater harvesting	122

List of Figures

9.1	Different components of a spring flow hydrograph	126
9.2	Various shapes of spring hydrograph	128
9.3	Determination of depletion time	132
9.4	Change in depletion time for Aita Barey (SP3) spring during pre- and post-springshed development programme	137
10.1	Major indicators for estimating the impact of a SSM project	145
10.2	Identification of plots for measurement of biomass productivity for predefined fixed dates during pre and post project period	151